

## POLICY RESEARCH WORKING PAPER

# Corporate Governance and Equity Prices

## Evidence from the Czech and Slovak Republics

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More concentrated ownership is generally expected to improve corporate governance. Evidence from the Czech and Slovak Republics during the privatization process supports this hypothesis. Equity prices in the Czech and Slovak Republics are high when a domestic or foreign investor acquires a majority of the ownership and low when ownership is shared among many investors.



## Summary findings

The 1992 Czechoslovakia mass privatization program involving about 1,500 enterprises and implemented through a voucher scheme with competitive bidding was a bold step in changing the ownership and governance of a large part of the economy. It represents a clear test case of one approach, and other countries may benefit from its lessons.

At the time, much skepticism was voiced about mass privatization: it would lead to diffuse ownership, and no effective corporate governance would result. But innovative forces led to the emergence of investment funds that collected much of the individuals' voucher points, leading to a much more concentrated ownership structure. It has been expected that this concentrated ownership would lead to improved corporate governance.

But the jury is still out. So far, only limited and largely anecdotal evidence is available on the impact investment funds have on the way firms are being managed. Too little time has passed and too many shocks have occurred (for example, the split of the Czech and Slovak Republics) to expect to find discernible changes in corporate governance on measures of actual firm performance.

An alternative approach is to investigate whether firms that ended up with more concentrated ownership — and possibly improved governance — sell for higher prices, either in the last voucher round or in the secondary market since then. In a forward-looking financial market, one can expect prices to incorporate the effects of better ownership on future firm performance and associated dividends to shareholders. Put differently, one would

expect that two firms with different shareholding structures, but otherwise identical, would trade at different prices — with the firm with a more concentrated ownership, and presumably better corporate governance, trading at a higher price. On a cross-sectional basis, ownership structure may thus be significant in explaining (relative) share prices.

Claessens explores this line of reasoning. Controlling for a number of firm and sector-specific variables, he finds that:

- Majority ownership by a domestic or foreign investor has a positive influence on firm prices.
- Firms with many small owners have lower prices.
- Ownership by many small-scale investors makes it easier for any single investor to establish effective control, but such control does not necessarily translate into higher prices.

Claessens provides two possible explanations of why higher prices appear to be associated only with majority ownership by a single investor:

- The corporate legal framework and the difficulty in collecting proxy votes in the Czech and Slovak Republics may prevent a small investor from making the necessary changes in the way firms are managed, thus keeping prices low.
- Commercial banks are both managers of investment funds and creditors of individual firms. Funds managers may face conflicts of interest and not be interested in increasing the value of equity alone but also the value of credits. This could explain why prices are relatively lower for those firms in which investment funds have effective control.

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**Corporate Governance and Equity Prices: Evidence  
from the Czech and Slovak Republics**

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## Introduction

Much has been written on the need for more effective corporate governance of firms in Eastern-Europe. Various schemes for privatizing state enterprises have been put forward to achieve this goal. The Czechoslovakia mass privatization program, implemented through a voucher scheme with competitive bidding, was a bold step at changing the ownership and governance of a large part of the economy. As such, it represents a clear test case of one approach and other countries may benefit from any lessons one can draw from it.

At the time, much skepticism was voiced about mass privatization: it would lead to diffuse ownership and no effective corporate governance would result. Innovative forces, however, led to the emergence of investment funds which collected much of the individuals' voucher points, leading to a much more concentrated shareholding. The expectation has since been that this concentrated ownership will lead to improved corporate governance. The jury is still out, however. So far, only limited and largely anecdotal evidence is available on the impact investment funds have had on the way firms are managed (see Anderson, 1994 and Mejstrik et al., 1994 for some examples). Too little time has passed and too many shocks have occurred (e.g., the split of the Czech and Slovak Republics) to (yet) expect to be able to find a discernable effect of changes in corporate governance on measures of actual firm performance.

An alternative approach is to investigate whether firms which ended up with more concentrated ownership sell for higher prices, either in the last voucher round or in the secondary market since then. In a forward-looking financial market, one can expect prices to incorporate the effects of better ownership on future firm performance. Put differently, one would expect that two firms with different share-holding structures, but otherwise identical, to trade at different prices, with the firm with a more concentrated ownership and presumably better corporate governance at a higher price. On a cross-sectional basis, ownership structure may thus be a significant factor in explaining (relative) share prices.

This paper explores this line of reasoning. It relates various indicators of the nature and concentration of ownership to the last bidding round prices and the secondary prices on the Prague Stock Exchange and the so-called RM-system. The empirical results support the hypothesis that concentration and prices are positively associated on a cross-sectional basis. Controlling for a number of firm and sector specific-variables, I find that the higher the equity share of strategic owners and the lower the dispersion of ownership, the higher the price. While many small owners and high dispersion make it easier for any single investor to establish effective control, such control is, however, not always associated with higher prices. It appears that only absolute control—majority share ownership—results in higher prices, perhaps a reflection of legal and corporate restrictions aimed at protecting minority shareholders and the difficulty in collecting proxy votes, or of conflicts of interests as some commercial banks are both managers of investment funds and creditors of individual firms.

The rest of the paper is organized as follows. First, I discuss the voucher scheme and resulting prices and ownership patterns, as well as the other firm-data I use. Next, I describe the link between ownership patterns and prices and develop the basic model to be tested. The third section then presents the results, while the conclusions are summarized in the last section.

## 1. The Voucher Scheme, Resulting Ownership and Prices

Voucher Scheme Anderson (1994), Shafik (1994a), Mejstrik et al. (1994), Triska (1994), Coffee (1994) and several others describe the mechanisms of the Czech-Slovak voucher scheme in detail.<sup>1</sup> Firms were selected for privatization and managers had to submit proposals for privatization, usually to the founding ministry. Competing proposals were also possible. Only very limited restructuring was allowed as part of the preparation of a firm for privatization. A proposal included the amount of equity of the firm which was to remain with the state, in the form of temporary or permanent holdings (through the National Property Fund).<sup>2</sup> If a direct domestic or foreign investor had been identified, then those shares would not be offered either. The remaining shares were made available through the voucher scheme.

All citizens of 18 years and older bought for a nominal fee of CSK 1035 (equivalent to about \$35, or about 25% of the average monthly wage) a package of vouchers worth 1000 points. With these points they could bid for a portion of the shares of 1491 firms on offer, or, in a pre-bidding "zero"-round, they could offer (part of) their points to investment funds, which could then bid for shares in the voucher scheme. A large number of these investment funds emerged on a voluntary basis. Altogether there were well over 430 funds established at the end of a registration period before the bidding rounds started. Funds were started by various sponsors (domestic and foreign banks, corporations and individuals), but most funds were sponsored by commercial banks and several banks started more than one fund (Mejstrik, 1994 and Coffee, 1994). Sponsoring involves the establishment of a management company which in turn organizes the fund and continues to have a management contract with the fund. The funds are established as joint stock companies and voucher holders are shareholders of the fund, whose assets are its shares in the firms.

As a result of active marketing campaigns by investment funds, many individuals offered all or most of their points to the funds. Funds ended up owning about 72% and individuals 28% of the total number of voucher points. Bank-sponsored funds acquired the most points. Egerer (1994) reports that the 10 largest bank sponsored funds hold 61% of all points acquired by all funds (or about 43% of all points offered through the voucher scheme). Looking at the sponsors of the funds rather than the funds themselves, Mejstrik et al. (1994) report that the top 3 sponsors alone have management contracts with funds which acquired 38% of all points.

Equilibrium voucher prices for each firm emerged through five sequential bidding rounds. For the first round, prices (points per share) were set identically for all firms. If demand matched the supply of shares of particular firm, all shares of that firm were sold in that round. If a firm's shares were undersubscribed, those that bid received shares at that price and the remaining shares were offered in the next round. When there was modest excess demand, citizens were given priority over investment funds and demand of investment funds was scaled

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<sup>1</sup>The following summary is largely based on Shafik (1994a).

<sup>2</sup>For all firms, 3% of shares was set aside to be used for future restitution.

down however much to clear the market. Finally, with large excess demand, no shares were sold and all shares would be on offer again in the next round. The first round took place on March 1, 1992 and the last one on December 22, 1992. Final exchange of shares for points followed the voucher bidding process. It did not take place until much later, however, in part due to the breakup of Czechoslovakia. After the exchange of shares for points was completed, secondary market trading started at the Prague Stock Exchange (PSE) and the so-called RM-system, a parallel trading system.

Information was made available on each firm covering items such as business activity, number of employees, output and profit in 1989-91, and prior allocation of shares (to the state, domestic and foreign investors, etc.). Investment funds played a major role in analyzing firms' prospects on the basis of this and other information. Through the mechanism of sequential bidding rounds, much of this information gathering and analysis of firms' prospects was reflected in the final prices (see further Shafik, 1994b).

Ownership The final ownership structure of the 1491 firms which emerged from the voucher scheme is described in Mejstrik et al. (1994). Table 1 provides the mean, standard deviation, minimum and maximum for the shares held by the five investor classes at the end of the bidding rounds: the state (summing several classes, *states*)<sup>3</sup>, investment funds (*ipfs*), domestic strategic investors (*dominv*) and foreign strategic investors (*frnginv*), and individuals (*idvs*). The mean share of the state is 8.37%. Domestic and foreign direct investors own respectively 3.25% and 1.34% on average. The low average for direct domestic and foreign investors and the state reflects the fact that most of firms were majority privatized through the voucher method.

The IPFs average equity share is 39.39%. The top 10 investment funds (*top1\_10*) own on average 38.36% of shares, close to the average share owned by all funds combined, consistent with the fact that the top 10 funds own about 72% of all points that were allocated to funds (Mejstrik et al, 1994). (Shafik 1994a and Mejstrik et al. 1994b also report that, while the investment funds acquired about 72% of the voucher points, the funds ended up owning a slightly lower fraction of shares on offer as they bid for more expensive firms.) Individuals own on average 36.53% of a given firm, slightly less than the average shares for all funds combined. In aggregate, the investment funds hold much more shares than households, however. This implies that individuals preferred to use their vouchers to acquire equity of smaller firms, in which they established a relatively larger equity stake. On average, about 11% of equity was not sold (this share is subsequently summed with *state*).

Across firms, ownership is quite varied, as the respective minimum, maximum and standard deviations in Table 1 show. The greatest range is for shares held by all individuals combined, followed by shares held by investment funds combined. The shares for these investor classes vary between close to 0% and 100%. For direct domestic and foreign investors and the

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<sup>3</sup>Shares held by the National Property Fund (through permanent, temporary and restitution share holdings), shares to be transferred to municipalities, and shares to be sold through banks.

state, shares vary between 0% and 84%. The correlations between the relative shareholdings of the various classes are all negative, suggesting that these classes are indeed separate and economically meaningful different owners.

Detailed data on ownership of individual firms by investment funds is provided in Mejstrik et al. (1994). The Czech and Slovak Republic Company and Investment Funds Acts restrict the investment funds from owning more than 20% of the equity of a given firm (see Coffee, 1994).<sup>4</sup> It appears that this constraint is only mildly enforced in practice. Orenstein (1994) reports, for example, that several investment funds in Slovakia exceed this limit. Nevertheless, a single fund is unlikely to have an absolute majority (more than 50%) stake in a given company. Analysis by Mejstrik et al. (1994) confirms this: for none of the 949 firms they analyze has any single fund more than 40% of equity and only for 9 firms has a single fund more than 30%. Analyzing the larger group of investment fund holdings in 1491 Czech and Slovak firms, I find a similar result. The highest share of a single firm's equity owned by a single fund (*top1*) is 32.44%, and for only two firms does a single fund own more than 30% (Table 1).

Effective Control The effective control a given investor may have over a firm depends not only on the fraction of the shares she owns, but also on the distribution of the shares of other owners. In an extreme case, an investor with only a very small fraction of shares, e.g., 10%, could have effective control over the firm if the rest of the shares were widely-distributed among the firm's remaining shareholders who do not collude. Mejstrik et al. (1994) analyze then also the degree of effective ownership for a sample of 919 firms. They do this by calculating the ownership of each investor relative to the overall ownership of 18 strategic investors.<sup>5</sup> They define a situation of effective control as a case where the equity held by a single strategic investor is more than 50% of the equity held by all (18) strategic investors. They find that one single fund can control 146 firms, two funds 473 firms and three funds 669 firms. This indicates that the funds could have much more effective control than their nominal shareholdings suggest.

Extending this approach to the larger sample of 1491 Czech and Slovak firms and using four strategic investor classes (the state, domestic and foreign investors, and the top 10 investment funds for a given firm), indicates that one single fund could control 273 firms (*controld1*), two funds 739 firms (*controld2*) and three funds 1013 firms (*controld3*, Table 2). In other words, for about half of the firms, two investment funds effectively control the firm (of course, these are not the same two funds for all firms). When all shares held by the state are

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<sup>4</sup>To prevent evasion through the use of multiple funds controlled by the same investment company, a further restriction is that the assets of all investment funds established by a single, individual investment company cannot represent more than 20% of the shares of the same issuer.

<sup>5</sup>They define the 18 strategic investors as direct domestic or foreign investors, the National Property Fund (through temporary, permanent, and restitution share holdings), shares to be transferred to municipalities, shares to be sold through banks, shares not (yet) sold, and the top 10 investment funds for the firm in question.

summed, the state could have effective control of 152 firms (*controls*). For another 100 either a domestic or foreign direct investor has control (*controld* and *controlf*). Combining the firms in which either two funds, one domestic, one foreign investor, or the state could effectively have control, I find 992 firms or 67% of all firms, with effective control by one party or two investment funds (*relctrl*). The large fraction of firms in which there is effective control by one (or two) investors indicates that nominal shareholding--on average, these investors combined own only 51% (*nonwide* in Table 2)--is not necessarily a good indicator of effective control.<sup>6</sup>

**Dispersion** A useful measure of the degree of ownership dispersion is the Herfindahl index (the sum of squared ownership shares).<sup>7</sup> This index,  $H$ , takes on the value of one if the firm is wholly owned by one single investor. If ownership is exactly equally distributed among all shareholders, then  $H$  will be the mean equity share held. For any other distribution of ownership, the index will be in between, with more dispersed ownership closer to the mean and less dispersed closer to one. In calculating the indicator  $H$  here, I use the same five shareholder classes for each individual firm (the state, the domestic and foreign investors, the investment funds, and individuals, where I include the shares not sold with those held by the state). The share held by any individual is set to zero for the calculation of  $H$  as any single individual owns only a marginally small amount of a given firm.

Calculating this indicator for the 1491 firms, I find that the mean  $H$ -indicator of dispersion is 14%, with a low close to 0% and a high of 87%, and a standard deviation of 13% (Table 2). A similar index for dispersion among the funds only (scaled, such that when one fund owns all fund shares, the index is one) has a mean of 33%, with a low of 7% and a high of 100%, and a standard deviation of 23%. Relatively speaking, ownership of the average firm among funds is thus more concentrated, consistent with the fact that the top ten funds acquired three-quarter of all voucher points.

A disadvantage of the  $H$ -index is that it does not consider the total amount of share-ownership by strategic investors. For example, if there are four strategic owners owning together 100% in all equal (25%) shares, then  $H$  will be the same as when one strategic owner owns 50%, with the rest widely distributed.<sup>8</sup> The second firm may, however, have more

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<sup>6</sup>Actually, the correlations between the share of equity held and a dummy which is one in case of effective control is also negative for investment funds and the state. It is positive for domestic investors, indicating that when they have a stake it tends to be for controlling purpose. For foreign investors, the correlation is zero. Combining one strategic investor or two funds, the correlation is negative again, consistent with the fact that the smaller the shares held by all strategic investors combined, the easier it is for any individual strategic investor (or two funds) to exercise control. Among the control dummies, there are no strong correlations (Table 2).

<sup>7</sup>Cable (1985) uses this index to investigate some aspects of corporate control in Germany and its effect on firm performance.

<sup>8</sup>Mathematically,  $4 \cdot (1/4)^2 = 1/4$ , which is equal to  $(1/2)^2 + \sum 0^2 = 1/2$ , where the share held by each individual is set to zero. I also calculate the equivalent  $H$ -index for dispersion in ownership among the nonwide investors only (which is equal to one if there is only a single nonwide investor, even when there are many individual investors).



effective governance than the first. I therefore also use the share of equity held by all (four) strategic investors combined (*nonwide*). The average share held by all strategic investors combined is 51%, with a standard deviation of 23% (Table 2). The low is close to zero and the high of 93%.

The mean equity share held by each of the four classes of strategic shareholders is 51%/4 or 13 percent, about equal to the mean of  $H$ , 14%. As indicated,  $H$  will be equal to the mean equity share held by each class if the shares are equally distributed. On average, there is thus an equal distribution of share holdings among the four classes of strategic owners. But, the correlation between *nonwide* and  $H$  is relatively low (0.41, Table 2), suggesting that they are separate indicators of ownership structure.

Prices I use three kind of prices: the prices of the last (5th) bidding round for both Czech and Slovak firms,<sup>9</sup> and secondary market prices for firms traded on the Prague Stock Exchange (PSE) and the Czech RM-system. The voucher prices cover 1469 firms; the number of firms for which I have PSE and RM-system prices are much less as they involve only Czech republic firms. Since the PSE and RM-system are continuously operating markets (PSE traded once a week initially, now trades three times a week and is planning to trade five days a week; and the RM-system traded once a month initially, and now every two weeks), there are many prices which can be analyzed. I choose prices from November 30, 1993 for the PSE as on that date the largest number of shares (338) were traded.<sup>10</sup> For the RM-system, I use the December 10th prices for altogether 714 stocks.

All prices are converted to their logarithms for two reasons. One, the voucher prices are not Czech Koruna (CK) prices, but rather shares per point. There is consequently a conversion from the voucher prices into CK (RM and PSE) prices which is uniform across all stocks. Using logs allows for the calculation of correlations between voucher and secondary market prices and makes the regressions for voucher and secondary market prices comparable. Second, all three price series have a very fat-tailed distribution when expressed in levels. In logs the

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Using this index instead leads to results qualitatively similar to those reported below.

<sup>9</sup>Shafik (1994b) analyzes the price determination in the voucher rounds and uses what she calls "final prices." These are the prices in the 5th round or the earlier prices of those stocks which had already been sold, with the modification that stocks which were oversubscribed in the 5th round and which were not yet sold for more than 50% are dropped (this implies that in total only 22 of the 1491 stocks offered in the voucher schemes are not included). I use this final price here too. I also used two other prices series: 5th round-prices and modified 5th round-prices, with the latter defined as the 5th round bidding prices excluding those 117 enterprises which were in excess demand in the 5th round, but including 255 enterprises already sold, making for 1374 enterprises. The results are qualitatively similar to the ones for the final price reported here.

<sup>10</sup>The PSE opened with trading on July 13, 1993; prior to October, trading was however limited to about 100 stocks. Since then the number of stocks traded on the PSE has increased.

price distribution is closer to a normal one.<sup>11</sup> Table 3 reports the statistics for these log prices.

There is a high correlation between the (logs of the) RM/PSE prices on one hand and the voucher prices (Table 3). Here the correlations are calculated for the 235 stocks which are traded on both the RM and the PSE at the end of November/early December and for which there also is a voucher price. The correlations between the (log of the) three prices are between 0.72 and 0.90. As expected, the highest correlation is between the RM and PSE prices as these prices are only 10 days apart.<sup>12</sup>

**Firm Data** In addition to the ownership variables mentioned above, for almost all the firms which were part of the voucher scheme, I have the following firm-specific variables: output, profit, credit, employment (the first three for the years 1989, 1990 and 1991), book value of equity, total book value of the firm, total liabilities (these for the year 1991 only), region, city, and branch of industry. I use these variables or combinations of them to control for the influence of non-ownership factors on prices. I do not have all independent variables for all firms for which I have one or more prices. This is particularly so for the secondary market prices. There are, for example, firms which are newly listed on the Prague exchange for which I do not have data on profits, ownership, etc. The number of useable observations for the PSE and RM prices is therefore less than the total available. In the basic regression, there are only 590 usable observations for the RM-system and 287 for the PSE, compared with 1204 for the voucher prices.

## 2. Corporate Governance, Firm Performance and Equity Prices

Ideally, one would like to have measures of actual individual firm performance (including changes in management) to investigate the influence of corporate governance and distribution of ownership on the firm. Megginson et al. (1994), Pinto et al. (1994), Pinto and van Wijnbergen (1994), and Galal et al. (1994) pursue this approach for state and/or newly privatized firms.<sup>13</sup> This has drawbacks, however. First, performance data will only be available ex-post, often with a considerable lag time. Also, firm data in Central and Eastern-Europe are of poor quality and international accounting standards are still being introduced. Second, exogenous shocks can affect firm performance, making it difficult to separate the effect of ownership.

An alternative approach which deals with some of these drawbacks is to use (publicly

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<sup>11</sup>This was verified using the Jarque-Bera normality test.

<sup>12</sup>The correlations between the first prices on the RM-system (6/18/93) and the PSE (7/13/93) and the 5th round prices are even higher: 0.90 and 0.97 respectively.

<sup>13</sup>Note that these studies concern themselves only with state or privately-owned firms, and do not study the effects of ownership distribution of privately-held firms on firm performance.

traded) share prices. In a forward-looking market, one can expect prices of firms to already incorporate the effects of changes in ownership and corporate governance on future firm performance. Put differently, one would expect two firms with different ownership structures, but otherwise identical, to trade at different prices. In particular, one would expect that firms with more concentrated ownership to trade at higher prices as there is a greater incentive on the part of owners to monitor the firm and make the necessary changes in management. This approach has, for example, been used by Lease et al. (1984), DeAngelo and DeAngelo (1985), and Levy (1983), who find positive relationships between stock prices and voting power for US firms.

I expect this cross-sectional relationship between ownership structure and (relative) share prices both for the voucher bidding rounds as well as for the secondary market trading. While it was not exactly known during the bidding rounds who would ultimately be successful in acquiring equity ownership in a particular firm, much of it could be inferred, especially by the investment funds.<sup>14</sup> As the voucher bidding progressed, funds then also adjusted the prices they were willing to pay for specific firms in light of the ownership pattern emerging from shares already sold. And indirectly, individuals acquired this information too (Shafik (1994b) shows that individuals adjusted their demand (and resulting prices) in response to the demand by investment funds).

Admittedly, prices may not have been set in a perfectly rational manner in the voucher bidding rounds. Investors may have simply followed other investors' strategies in the (perhaps mistaken) belief that these had better knowledge about the firms' prospects. But, unless the market is assumed to have remained inefficient, mistaken beliefs should have become apparent quickly and prices be adjusted to their true values. Since I use, in addition to the voucher prices, also secondary market prices of about a year after the last bidding round was closed, any initial mistaken beliefs would likely have been corrected over this period.<sup>15</sup>

The relationship between ownership structure and share prices could be negatively affected by conflicts of interests. Coffee (1994) extensively discusses this potential for conflict of interests in case of the Czech investment funds. As mentioned earlier, most funds are sponsored by commercial banks, which themselves are large creditors of the firms in which the

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<sup>14</sup>This was made easier by the fact that a number of investment funds had made their investment strategies known before the bidding rounds started. For example, there was one fund who had announced that it would buy a particular hotel; and several funds specialized in a particular sector or "country" (Czech Republic or Slovakia), or emphasized growth or dividends. Some other investment funds had either stated (e.g., the fund sponsored by the Savings Bank) or had little choice—because of the size of voucher points they had accumulated and regulations restricting their investment in any given company—but to diversify their investments across a large number of enterprises and be a mostly passive investor.

<sup>15</sup>This is especially true for the influence of ownership variables since the final picture of ownership was available when secondary market trading started. I show below that, while voucher prices and secondary market prices are closely related, ownership variables play a much more important role for the secondary market prices than for the voucher prices.

funds hold equity stakes. In the bidding rounds, the funds' management may therefore also have had the interests of the bank as creditor in mind when deciding in which company to invest. This conflict of interests may have continued and influenced the secondary market prices. While the funds are joint stock companies, and thus formally governed by the boards elected at the annual meeting of shareholders, it is likely that individual shareholders exerted little indirect control over a fund's management. In most cases, banks continue to be closely involved in the management of the funds and reportedly some banks exert much influence on the firms in which they also are a creditor.

If these conflicts of interests happens on a large scale, secondary market prices may be negatively influenced, especially for a firm with large ownership by a single fund where the fund is managed by a bank to which the firm is also a large debtor. This effect would imply that large ownership by an individual, bank sponsored fund could lead to lower prices, keeping everything else constant. In addition, there is the possibility that managers of the funds, regardless of their links to creditor banks, have poor incentives to maximize the final value to the fund shareholders. Coffee (1994), for example, mentions that the permitted fee structure may not provide the best incentive for the managers to maximize the firms' current share prices. Furthermore, fund managers appointed to the board of a firm are most often paid a fee by the firm.<sup>16</sup> This potentially weakens the independence of the fund manager vis-a-vis the firm. These effects would go in the opposite direction from what I hypothesize is the main relationship between concentration of ownership and prices.<sup>17</sup> As such, it can not lead to me falsely accepting the null-hypothesis that concentrated ownership leads to higher prices.

An econometric problem which could arise is that the non-ownership variables I use, can not control for all the characteristics of a firm (e.g., the quality of its management). This could lead to a bias in the coefficients of the other right hand side variables if the omitted variable is correlated to these variables. To bias the coefficients for the ownership variables--the coefficients I am interested in, the omitted variable(-s) would have to be correlated to the structure of ownership. But, provided the bidding process and secondary market trading are competitive--which it appears to have been, there are no strong a-priori reasons to think that omitting variables could lead to a spurious correlation between the prices of firms and their ownership structures. Also, i. the variables I use are poor proxies (e.g., the profit-measure I use may poorly reflects true past profitability), the coefficients of all variables can be biased, unless the proxy is a linear function of the true variable. One way I check for these potential biases is by performing robustness tests on the sign and significance of the ownership variables (reported below).

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<sup>16</sup>In case of some funds managed by banks, the directors appointed to the board of the firms may include bank employees.

<sup>17</sup>Coffee also stresses the large cross-ownership among banks and insurance companies in the Czech Republic. The implications of this concentrated ownership for equity prices are not obvious, however.

### 3. Results

**Variables Finally Used** I relate equity prices of individual firms to various ownership concentration variables and other, controlling variables. Shafik (1994b) and Mejsstrik (1994) have estimated price equations for voucher and PSE prices and provide some suggestions for right-hand side variables, beside the ownership variables. I use the ones they report and add other ones. The following variables are significant in one or more of the three price series: the growth rate of output of the firm between 1989 and 1991 (*outg*), the book value of equity (*bookval*), employment in 1991 (*emplo91*), profit in 1991 (*profit91*), equity per employment (*equ\_emp*), profit per output (*pro\_out*), employment per output (*emp\_out*), the squared employment rate (to account for possible non-linearities, *emplo2*), dummies for sectors (construction, *dumco*, and services, *dumse*), and a dummy for a region (West Bohemia, *dumwb*). Shafik (1994b) and Mejsstrik (1994) already provide possible explanations why these variables are significant. Table 4 presents the mean and standard deviation statistics for these variables as well as the matrix of cross-correlations. Size (*bookval* and *emplo91*, which are highly correlated) has a negative effect on prices. As employment squared has a positive sign, it appears that beyond a certain level, a large labor force tends to increase prices, perhaps a reflection of expected state support. Profitability (*profit91* and *pro\_out*) has a positive effect, while high capital intensity (*equ\_emp*) has a negative effect. The fact that *emp\_out* has a positive effect on shares prices suggests that high labor intensity (and low capital intensity) is considered a comparative advantage.

The effect of ownership distribution on prices is a complex one. I therefore use several alternative variables, including the variables already introduced: the Herfindahl index *H* and the share of equity held by the strategic investors (*nonwide*). In addition, I use the following variables: the percentage of shares sold to foreigners (*frnginv*); the percentage of shares sold to individual domestic investors (*dominv*); the shares held by the first most important investment funds (*top1*), the second most important (*top2*); etc. as well as the sum of the shares of the first through *n*th most important fund (*top1\_n*); and dummies indicating whether a particular investor, or *n*-number of funds, or any strategic investor has effective control (*control*). Obviously, some of these variables are closely related; for example, the correlations between the shares of the state and a dummy indicating its effective control is 0.78, and that between the shares of domestic and foreign investors and dummies indicating their control, 0.87 and 0.89 respectively. It is consequently difficult to discriminate between the effects of individual variables. But, several correlations are actually negative, for example between the equity share held by all funds together and effective control by one or two funds.

**Results** Not all variables are significant for all three price series, in part due to the high collinearity between some of the firm-variables (e.g., *profit91* and *bookval*, 0.92, see Table 4). Table 5 therefore only lists the results for the specifications for each price series which include the significant non-ownership explanatory variables and one or more ownership variables. The regressions have a good explanatory power. For example, compared to the results obtained by Shafik (1994b), the regressions here have better  $R^2$ s (the highest is 0.35 versus the highest reported by Shafik of 0.10), often with a much smaller number of right hand side variables.

The fit of the regressions is very similar across the prices series. As found by Mejsatrik et al. (1994), sector dummies are significant for all equations, but not always the same dummies for all three price series.

The influence of firm-specific, non-ownership data appears to be much less than previously reported. Several of the firm-specific variables found to be significant by Shafik (1994b) and Mejsatrik et al. (1994) are no longer significant, e.g., the ratio of total liabilities to equity and the ratio of profit to equity are no longer significant. This is especially so for the non-voucher prices. For the PSE and RM prices, respectively only two and three firm-specific variables are significant.<sup>18</sup> The fact that more non-ownership variables are significant for the voucher prices is perhaps to be expected; at that time, no complete information about the final ownership was available and non-ownership variables were likely used more extensively to determine the relative value of firms.

The results for the ownership variables are the following. The degree of non-wide ownership, *nonwide*, has for all three prices a significant, positive influence. And, the lower the dispersion of ownership (the higher *H*), the higher the price. The regressions which combine *H* and *nonwide* in one regression, indicate that both have simultaneously a positive effect for all three price series. In other words, higher concentration tends to have a positive effect on prices even when controlling for a higher degree of strategic ownership and vice-versa. But there is some evidence of collinearity as in case of the PSE and voucher prices, while still positive, *H* is no longer statistically significant. It appears that high strategic ownership (*nonwide*) is more important than ownership concentration (*H*) in terms of its effect on prices.

High ownership by domestic or foreign strategic investors (*dominv* and *frnginv*) also exerts a significant positive influence on prices, for all specifications reported. As the variable *nonwide* is also included, this effect is on top of the positive effect of high ownership by all strategic investors combined. The relative effect of domestic and foreign ownership on prices is similar, but there is a slightly higher significance for domestic ownership for most equations. Effective control by a domestic or foreign strategic investor also exerts a positive influence on prices (results are not reported). *Controld* and *controlf*, dummies which take on the values of one if the shares of the foreign or domestic investor among *nonwide* is larger than 50%, are positive for all specifications used and, except for the PSE prices, almost always significant. The relative effect of domestic and foreign control on prices is again similar, but there is also a somewhat higher significance for domestic control. These results suggest that there are benefits from a single domestic or foreign controlling owner over and above the effects of concentrated and/or large total strategic ownership.

The share of state ownership—*states*—has consistently a positive and significant influence on the voucher price. For the other two price series, it is mostly positive but not always

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<sup>18</sup>Qualitatively, the regressions for the RM and PSE prices show similar results as for the voucher prices when using the same specification, but not all the same right hand side variables are significant.

significant (not reported). Effective control by the state--*controls*, a dummy which takes on the value one if the state share as a fraction of *nonwide* is larger than 50%--has, however, almost always a negative effect on prices. Whether or not I control for domestic or foreign strategic ownership, the coefficient for *controls* is most often negative, and significantly so, and if positive, rarely significant (not reported). These two results suggests that having the state as another owner can be useful, perhaps as it allows for some beneficial treatment of the firm (e.g., favorable credits),<sup>19</sup> but that having the state control the firm is perceived to have a negative effect on the value of the firm.

I investigate the effect of ownership by investment funds on prices by including in the regression the total equity stake of all funds, *ipfs*, for the particular firm. This way I also investigate whether investment funds perhaps collude, which would imply that not just the equity shares of the top investment funds are positively related to the share prices.<sup>20</sup> I find that the coefficient for the equity share of all investment funds combined is significantly positive (Table 6, where only the results without *nonwide* are reported). This effect is difficult to separate, however, from the influence of large strategic ownership in general as there is a relatively high correlation between *nonwide* and *ipfs*, 0.59.

There is a clear tradeoff, however, between *nonwide* and *H* on the one hand and effective control, particular by investment funds, on the other hand. As reported, the lower *nonwide*, the easier it is for a given strategic investor--particularly investment funds--to have a controlling stake (as it takes a lower share of equity). I show this by using the dummy *relctrl*, which is one for those firms where there is any investor (whether the state, domestic, foreign or one or two investment funds) which has effective control (defined as a fraction of *nonwide* larger than 50%). This dummy has a negative correlation with the share of *nonwide*, -0.42. I now use the dummy *relctrl* to see whether a controlling stake in itself leads to higher share prices. Table 7 shows that, even when I control for *nonwide* and *H*, the coefficient for *relctrl* is negative, and significant in almost all cases (when controlling for *nonwide* alone, the coefficient is not significant for PSE and RM prices, but still significant for the voucher prices). It appears that this result largely arises because the investment funds can establish more easily control when *nonwide* is small. A *controli* dummy--indicating control by the top 2 investment funds alone--has then also a correlation of -0.61 with *nonwide*. Using *controli* instead of *relctrl*, I find that *controli* explains most of the negative influence on prices of controlling ownership (not reported).

These results suggest that high absolute strategic ownership has a positive effect on prices, but that effective control, particularly by investment funds, does not have a positive influence on prices--actually a negative influence. This tradeoff could arise on three accounts:

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<sup>19</sup>The fact that for the more recent PSE and RM prices, the coefficient for the share of state ownership is no longer significant may reflect a revision of this view, at least for the Czech Republic.

<sup>20</sup>I also used the total equity shares held by the top one through top "n" investment fund. The results are very similar to using *ipfs*, as these equity shares are highly correlated with *ipfs*.

one, legal and corporate by-law restrictions which are aimed at protecting minority shareholders; two, conflicts of interests; and three, a poorly functioning secondary market which does not easily allow an investor to increase its equity stake. I call the first the *absolute majority hypothesis*, the second the *expropriation hypothesis*, and the third the *secondary market hypothesis*.

**Absolute majority hypothesis** Under the *absolute majority hypothesis* legal and corporate by-law restrictions may prevent strategic owners from making radical changes in the way the firm is managed without consent of a large fraction of shareholders. But, consent may be difficult to obtain as few small shareholders can or will bother to vote. This would prevent effective control by a small strategic shareholder, even when its share among other strategic shareholders is large (more than 50%). A larger, absolute majority ownership stake may be thus necessary to improve corporate governance.

**Expropriation Hypothesis** A somewhat opposite situation could occur when residual shareholders are being diluted by a controlling shareholder who has also other interests. In this case, the controlling, but perhaps not absolutely large shareholder would have effective control over the firm--and may be increasing the overall value of the firm, but the equity price of the firm is not necessarily higher as firm value is being diverted to the firm's creditors (i.e., banks) or other parties. As mentioned, funds are often controlled by banks who are also the major creditors of the firms. Consequently, conflicts of interests more likely exist for investment funds than for other equity holders.

I do not have data on the debts of each firm to each bank to be able to identify banks which are at the same time large creditor and sponsor of a fund which has a large equity stake in the same firm. I can thus not test the expropriation hypothesis directly. But, two things are worth noting. One, the fact that the negative coefficient for *relctrl* reported above largely arises from investment funds ownership--which are the most likely owners with a conflict of interests, lends some support to this hypothesis. Second, the incentive to dilute the interests of residual shareholders decreases as one's own shareholdings increases, i.e., the marginal return to dilute declines as ownership increases. In this sense, the expropriation and absolute majority hypotheses go the same direction.

I now verify the *absolute majority hypothesis* by running regressions where I use a dummy for absolute control--equity share greater than 50%--of any of the strategic investors, *absctrl*. There is a big difference between the number of firms in which there is one shareholder (or two funds) with absolute control and the number of firms for which there is one shareholder (or two funds) with relative control among the strategic shareholders. With a cutoff of 50%, for only 8% of the firms is there a shareholder with absolute control, versus 67% of the firms with relative control. The difference is particularly large for the investments funds. There is no firm in which the top two funds have absolute ownership, but for about half of the firms, the top two funds have a controlling stake among all strategic owners.



I run the regressions now with *absctrl* (but without *dominv*, *frginv*, *nonwide* and *H* as these are positively correlated with absolute control). The results are that *absctrl* has a significant, positive sign for all three price series, confirming the *absolute majority hypothesis* (Table 8). Since the regressions are in log prices, the coefficients for *absctrl* indicate (approximately) the percentage increase in prices as a result of crossing the threshold for absolute control. This elasticity is quite high, between 40% and 100% for the three price series.

I next vary in steps of 5 percentage points the ratio of equity held by a single investor for which I define "absolute control" to occur. Figure 1 plots the fraction of firms for which there is an "absolute" controlling shareholder at different cutoff levels of equity owned. For lower cutoff levels, there are obviously more firms for which there is a shareholder with "absolute" control. With a cutoff of 30%, about 45% of the firms has a shareholder with "absolute" control. With a cutoff of 20%, about 80% of firms has an "absolute" controlling shareholder. Figure 1 also plots the cross-sectional variance in *absctrl*. It is, as expected, small for low as well as for high cutoffs ratios: all firms will have an "absolute" owner at a 0% cutoff and none at 100%, causing the lower cross-sectional variation at the tails.

I now rerun the regressions using the different cutoff levels. Figure 2 plots the coefficients for the various cutoff levels for the three prices series (I use the same specification as reported above in Table 8).<sup>21</sup> The coefficients for *absctrl* are significantly positive for all cutoff ratios. For cutoff ratios below about 30%, the coefficients for *absctrl* decline. At ratios above 30%, however, the coefficients for *absctrl* increase for all three prices series and "absolute" control has a strong positive effect on prices. The effect levels off for ratios above 60% to an elasticity between 75% and 125%. The effect appears to be the strongest for the voucher prices, followed by the RM and PSE prices.

The fact that the coefficients sharply increase for ratios above 30% could be consistent with the corporate legal framework in the Czech and Slovak Republics. Gray (1993) and Gray and Hanson (1993) report that the minimum quorum requirement in the Czech and Slovak Republics is 30% and the minimum majority requirements are generally above 50% (for instance, more than 50% is required to remove directors and supervisors, and a supra-majority of 66% is necessary for fundamental changes, such as an increase or reduction in equity, dissolution of the company, and changes in the company statutes). At the same time, funds are prohibited from owning more than 20% of a firm's shares. Individual funds may thus lack the ability to make fundamental changes.<sup>22</sup>

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<sup>21</sup>With *dominv* and *frginv* included the coefficients for *absctrl* are generally still positive and mostly significant, and show a similar pattern in case of the voucher and RM prices, but less so for the PSE prices. With both *nonwide* and *H* included, *absctrl* is most often not significant and its coefficient fluctuates between positive and negative values.

<sup>22</sup>It is interesting to note that in the Fall of 1994, the head of the Czech National Property Fund proposed to abolish all limits on fund ownership, so that a fund could own 100% in a single enterprise. Apparently, this led to no changes, however. At the opposite, the Ministry of Finance appears to be enforcing now the 20%-rule,

In general, a small ownership stake need not weaken the power of a relative controlling shareholder even in the presence of high majority requirements. In Germany, for example, the proxy process tends to support the creditor banks of the firm, which themselves are most often minority equity holders. German banks effectively hold the proxy votes of small shareholders and they can use these if a larger absolute majority is necessary. In the US, by contrast, access to shareholder lists tends to be controlled by managers and the proxy process thus tends to support incumbent management. Since the custodial and proxy voting systems are likely not yet well developed in the Czech and Slovak Republics, passive shareholders' votes are essentially lost to either minority shareholders or managers.<sup>23</sup> The regression results here suggest that this is to the detriment of all shareholders as the value of the firm is lower.

Secondary market hypothesis I next verify the *secondary market hypothesis* by running (for the PSE-prices only) regressions which include the relative amount of trading which occurs in each stock. I use the (log of the) ratio of volume (number) of stocks traded relative to original book value as our measure of *turnover*.<sup>24</sup> I expect that this liquidity measure will have a positive influence on prices for two reasons: one, it will lower bid-ask spreads and the required rates of return, thus raising stock prices; and two, it will make it easier for a given investor to build up a controlling stake in a firm. The first effect would show up as a positive sign for *turnover* in the regressions. The second effect would imply a lower importance of *relctrl* (relative to not having *turnover* included), as having a relative controlling stake currently becomes less relevant.

Table 9 reports the result when using the same right hand side variables as in the basic regression.<sup>25</sup> The results of the right two panels confirm the first effect as the sign for *turnover* is positive. Regarding the second effect, the importance of *relctrl* is not affected, however, by the inclusion of *turnover* and it still maintains a negative sign (middle column) which is not less than that for the basic regression (left column). This is true for all specifications. It thus appears that an inability to acquire more stocks due to a lack of liquidity does not explain the negative sign for *relctrl*.

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something it was not doing very strictly earlier.

<sup>23</sup>An anecdote can illustrate this. For its first General Assembly meeting, the Czech Savings Banks had rented a sports stadium to accommodate its about 80,000, mostly individual shareholders. Supposedly, only 12 shareholders, mostly representatives of investment funds, attended the meeting.

<sup>24</sup>As I use the PSE-prices as of November 30, I use the average of the daily volume traded prior to that date.

<sup>25</sup>For all four specifications (with and without *nonwide* and/or *H*), *turnover* is always positive, albeit only significant in two of the four regression specifications. *H* isn't always significant. I use the specification with both *nonwide* and *H*.

#### 4. Conclusions

The Czech and Slovak voucher scheme led to more concentrated ownership than expected. Of the shares offered through the voucher scheme two-thirds ended up with investment funds and one-third with private individuals. And of the shares owned by investment funds, 72% is owned by the top ten funds. Analysis of market prices suggests two, not surprising findings: more concentrated ownership is associated with higher prices, both for the last voucher round prices as well as for the secondary market prices; and higher prices are also associated with high absolute ownership among strategic investors.

The empirical analysis also suggests that controlling ownership—a relative majority stake by one strategic investor among all strategic investors—does not lead to higher prices. This appears to be associated with low absolute shareholdings. This is especially relevant for the investment funds. While one or two funds often have a controlling stake among all strategic owners, the absolute amounts of equity held by one or two funds together in a firm are relatively small, usually less than 25%. This appears to limit the ability and/or willingness of one (or two funds together) to make changes in the way firms are managed, thus keeping prices relatively low.

An important factor which could explain this is the legal system in the Czech and Slovak Republics. There are certain minimum, absolute majority requirements for important decisions, which limit the power of owners which have only small absolute ownership stakes. Important here may be the proxy voting system. While it generally depends on a number of factors how the proxy process finally affects corporate governance, under certain systems minority shareholders can increase their influence using proxy votes. But a necessary condition is that proxy votes can be mobilized. This is likely not the case in the Czech and Slovak Republics. This appears to have the effect of shifting power away from strategic shareholders which only have a minority stake, limiting effective corporate governance. This may explain the lack of a positive effect of relative controlling ownership on prices.

An alternative explanation is that the funds, which are often managed by banks, face conflicts of interests and are not necessarily interested in increasing the value of equity alone. This could explain the result that prices are relatively lower for those firms in which investment funds have effective control. This paper did not address the questions whether such type of "conflicts of interests" hinder or help the restructuring of firms—the main source of overall efficiency gains. Whether or not policy measures aimed at a strict(-er) separation between the fund management functions of a bank and its normal, commercial lending operations are required can thus not answered.

## References

- Anderson, Robert E., 1994, "Voucher Funds in Transitional Economies: The Czech and Slovak Experience," PR Working Paper, no. 1324, the World Bank.
- Cable, John, 1985, "Capital Market Information and Industrial Performance: The Role of West German Banks," The Economic Journal 95, March, 118-132.
- Coffee, John C. 1994, "Investment Privatization Funds: The Czech Experience," paper presented at the joint World Bank/CEUPP Conference on Corporate Governance in Central Europe and Russia, December 15-16, Washington, DC.
- DeAngelo, Harry and Linda DeAngelo, 1985, "Managerial Ownership of Voting Right: A Study of Public Corporations with Dual Classes of Common Stock", Journal of Financial Economics 14, 33-69.
- Egerer, Roland, 1994, "Investment Funds and Corporate Governance in Emerging Markets: An Assessment of the Top Ten Voucher Funds in the Czech Republic," mimeo, the World Bank, December.
- Galal, Ahmed, Leroy Jones, Pankaj Tandon and Ingo Vogelsang, 1994, Welfare Consequences of Selling Public Enterprises, Oxford University Press/the World Bank.
- Gray, Cheryl W., 1993, "The Legal Framework for Private Sector Activity in the Czech Republic," Vanderbilt Journal of Transnational Law, 26:2, May.
- Gray, Cheryl W. and Rebecca J. Hanson, 1993, "Corporate Governance in Central and Eastern Europe" Lessons from Advanced Market Economies," PR Working Paper, no. 1182, the World Bank.
- Lease, Ronald C., John J. McConnell and Wayne H. Mikkelson, 1984, "The Market Value of Differential Voting Rights in Closely held Corporations," Journal of Business 57:4, 443-467.
- Levy, Haim, 1983, "Economic Evaluation of Voting Power of Common Stock," Journal of Finance 38, 79-93.
- Meggison, William L., Robert C. Nash, and Matthias van Randenborgh, 1994, "The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis," Journal of Finance 49:2, 403-452.

- Mejstřík, Michal, Radek Laštovička and Anton Marcinčin, 1994, "Privatization and Opening the Capital Market in the Czech and Slovak Republics," Working Paper No. 54, IES, CERGE, EU, Prague.**
- Orenstein, Mitchell, 1994, "Voucher Privatization and Restructuring in Slovakia," Institute of EastWest Studies, July.**
- Pinto, Brian, Marek Belka, and Stefan Krajewski, 1993, "Transforming State Enterprises in Poland: Evidence on Adjustment by Manufacturing Firms," Brooking Papers on Economic Activity I, 213-270.**
- Pinto, Brian, and Sweder van Wijnbergen, 1994, "Why State Firms Defy the Odds," PR Working Paper, no. 1308, the World Bank.**
- Shafik, Nemat (1994a), "Making a Market: Mass Privatization in the Czech and Slovak Republics," PR Working Paper, no. 1231, the World Bank.**
- Shafik, Nemat (1994b), "Information and Price Determination Under Mass Privatization," PR Working Paper, no. 1305, the World Bank.**
- Triska, Ducan, 1994, "Post Privatization Securities Markets in the Czech Republic," paper presented at the Fifth Meeting of the OECD Advisory Group on Privatization, March 2 - 4, Paris.**

**Table 1: Descriptive Statistics**  
(Shares held by various investor classes)

Investor Class	Mean	Std Dev	Minimum	Maximum
STATE	8.37%	15.38%	0.00%	84.00%
IDVS	36.53%	21.62%	1.56%	96.82%
IPFS	39.39%	22.22%	0.00%	90.89%
DOMINV	3.25%	12.51%	0.00%	84.00%
FRNGINV	1.34%	8.00%	0.00%	80.00%
NOTSOLD	11.12%	10.40%	1.14%	92.83%
TOTAL	100.00%	NA	NA	NA
<b>Investment Funds</b>				
TOP1	13.42%	6.26%	0.00%	32.44%
TOP2	8.78%	5.60%	0.00%	22.79%
TOP1_2	22.20%	10.86%	0.00%	49.97%
TOP1_10	38.36%	21.32%	0.00%	86.52%

**Correlation Matrix**

Investor Class	STATE	IDVS	IPFS	DOMINV	FRNGINV	NOTSOL
STATE	1.00	-0.40	-0.20	-0.08	-0.03	-0.10
IDVS	-0.40	1.00	-0.51	-0.22	-0.15	-0.00
IPFS	-0.20	-0.51	1.00	-0.24	-0.17	-0.35
DOMINV	-0.08	-0.22	-0.24	1.00	-0.03	-0.07
FRNGINV	-0.03	-0.15	-0.17	-0.03	1.00	-0.01
NOTSOLD	-0.10	-0.00	-0.35	-0.07	-0.01	1.00

**Table 2: Control and Dispersion Variables**

<b>Effective Control Variables</b>		<b>Mean</b>	<b>Std Dev</b>	<b>Number of Firms</b>	
	<b>CONTRLD1</b>	18.31%	38.69%	273	
	<b>CONTRLD2</b>	49.56%	50.01%	739	
	<b>CONTRLD3</b>	67.94%	46.69%	1013	
	<b>CONTROLS</b>	10.19%	30.27%	152	
	<b>CONTROLD</b>	4.83%	21.44%	72	
	<b>CONTROLF</b>	1.88%	13.58%	28	
	<b>RELCTRL</b>	66.53%	47.20%	992	
<b>Dispersion Variables</b>		<b>Mean</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>
	<b>H</b>	13.57%	13.04%	0.10%	86.51%
	<b>NONWIDE</b>	51.32%	23.21%	0.01%	93.46%

**Correlation Matrix**

<b>Variable</b>	<b>CONTROLS</b>	<b>CONTROLD</b>	<b>CONTROLF</b>	<b>RELCTRL</b>	<b>NONWIDE</b>	<b>H</b>
<b>CONTROLS</b>	1.00	-0.08	-0.05	0.24	0.19	0.52
<b>CONTROLD</b>	-0.08	1.00	-0.03	0.16	0.19	0.36
<b>CONTROLF</b>	-0.05	-0.03	1.00	0.10	0.10	0.21
<b>RELCTRL</b>	0.24	0.16	0.10	1.00	-0.42	0.15
<b>NONWIDE</b>	0.19	0.19	0.10	-0.42	1.00	0.41
<b>H</b>	0.52	0.36	0.21	0.15	0.41	1.00

**Table 3: Prices**

Prices (in logs)		
	Mean	Std Dev
Voucher Price	0.33	1.19
PSE-Price	6.16	0.87
RM-Price	5.77	0.83

Correlation Matrix Prices (in logs)			
	Voucher Price	PSE-Price	RM-Price
Voucher Price	1.00	0.72	0.82
PSE-Price	0.72	1.00	0.90
RM-Price	0.82	0.90	1.00



**Table 4: Firm Variables**

Variable	Mean	Std Dev	CV
OUTG	1.16	0.49	0.43
BOOKVAL	381348.85	3.26E+12	8543201.33
EMPLO91	842.77	3143674.96	3730.15
PROFIT91	70956.38	4.84E+11	6825446.56
EQU_EMP	519.78	23917281.02	46014.47
PRO_OUT	0.06	0.12	1.89
EMP_OUT	0.00	0.00	0.01
EMPLO2	3851835.66	1.43E+15	372445796.54
DUMCO	0.19	0.16	0.81
DUMWB	0.06	0.06	0.94
DUMSE	0.09	0.08	0.91

**Correlation Matrix**

	OUTG	BOOKVAL	EMPLO91	PROFIT91	EQU_EMP	PRO_OUT	EMP_OUT	EMPLO2	DUMCO	DUMWB	DUMSE
OUTG	1.00	0.12	0.06	0.12	0.15	0.20	-0.30	0.04	-0.13	0.05	0.02
BOOKVAL	0.12	1.00	0.61	0.92	0.22	0.05	-0.11	0.51	-0.06	-0.01	-0.04
EMPLO91	0.06	0.61	1.00	0.38	0.02	0.04	-0.12	0.84	-0.05	0.00	-0.08
PROFIT91	0.12	0.92	0.38	1.00	0.17	0.07	-0.08	0.31	-0.04	-0.01	-0.01
EQU_EMP	0.15	0.22	0.02	0.17	1.00	-0.05	-0.15	0.03	-0.05	-0.02	0.02
PRO_OUT	0.20	0.05	0.04	0.07	-0.05	1.00	-0.43	0.01	-0.01	0.03	0.00
EMP_OUT	-0.30	-0.11	-0.12	-0.08	-0.15	-0.43	1.00	-0.05	0.07	-0.06	0.22
EMPLO2	0.04	0.51	0.84	0.31	0.03	0.01	-0.05	1.00	-0.03	0.07	-0.02
DUMCO	-0.13	-0.06	-0.05	-0.04	-0.05	-0.01	0.07	-0.03	1.00	0.02	-0.15
DUMWB	0.05	-0.01	0.00	-0.01	-0.02	0.03	-0.06	0.07	0.02	1.00	0.03
DUMSE	0.02	-0.04	-0.08	-0.01	0.02	0.00	0.22	-0.02	-0.15	0.03	1.00

**Table 5: Basic Regressions Results**

<b>Voucher-Price</b>				<b>PSE-Price</b>				<b>RM-Price</b>			
Usable OBS	1204	DOF	1187	Usable OBS	287	DOF	280	Usable OBS	590	DOF	581
R**2	0.32	R Bar **2	0.31	R**2	0.36	R Bar **2	0.35	R**2	0.32	R Bar **2	0.31
	Coeff	T-Stat	Signif		Coeff	T-Stat	Signif		Coeff	T-Stat	Signif
Constant	2.17	16.37	0.00	Constant	4.64	32.57	0.00	Constant	4.79	39.33	0.00
OUTG	0.27	3.99	0.00	OUTG	0.42	6.29	0.00	OUTG	0.26	2.48	0.01
BOOKVAL	-0.00	-2.80	0.01	DUMCO	0.35	2.94	0.00	EQU_EMP	-0.00	-2.69	0.01
EMPLO91	-0.00	-6.27	0.00	NONWIDE	1.26	5.55	0.00	DUMSE	0.33	3.15	0.00
PROFIT91	0.00	3.39	0.00	H	0.45	1.29	0.20	DUMWB	0.29	3.21	0.00
EQU_EMP	-0.00	-2.36	0.02	DOMINV	1.18	2.23	0.03	H	1.44	4.82	0.00
PRO_OUT	0.33	1.92	0.05	FRNGINV	1.11	1.86	0.06	NONWIDE	0.64	4.11	0.00
EMP_OUT	44.79	4.16	0.00					DOMINV	1.03	3.39	0.00
EMPLO2	0.00	4.23	0.00					FRNGINV	1.40	3.17	0.00
DUMSE	0.23	2.08	0.04								
DUMCO	-0.25	-3.39	0.00								
DUMWB	0.51	4.53	0.00								
NONWIDE	1.23	7.49	0.00								
H	0.13	0.28	0.78								
STATES	1.31	4.08	0.00								
DOMINV	1.70	5.43	0.00								
FRNGINV	1.26	3.10	0.00								



Table 7: Regression Results Using Relative Control

Variable	Voucher Price			PSE Price			RM Price		
	Coef	T-Stat	Signif	Coef	T-Stat	Signif	Coef	T-Stat	Signif
Constant	2.52	4.35	0.00	4.33	15.73	0.00	3.15	15.45	0.00
OUTG	1.57	4.15	0.00	1.42	3.40	0.00	1.15	1.33	0.18
BOOKVAL	-0.01	-0.31	0.75	-0.01	-0.02	0.98	-0.01	-0.03	0.97
EMPLOYM	-0.01	-0.71	0.48	0.01	0.02	0.98	0.01	0.03	0.97
PROFITY	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
EQU_EMP	-0.01	-0.25	0.80	0.01	0.02	0.98	0.01	0.03	0.97
PRO_OUT	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
EMP_OUT	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
EMPLOY	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
OWNSE	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
OWNCO	-0.02	-0.11	0.92	-0.01	-0.02	0.98	-0.01	-0.03	0.97
OWNINS	0.01	0.38	0.70	0.01	0.02	0.98	0.01	0.03	0.97
OWNWIDE	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
H	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
STATES	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
DOMINY	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
FRNGINY	0.01	0.27	0.79	0.01	0.02	0.98	0.01	0.03	0.97
RELCTRL	-0.17	-0.43	0.67	-0.01	-0.02	0.98	-0.01	-0.03	0.97

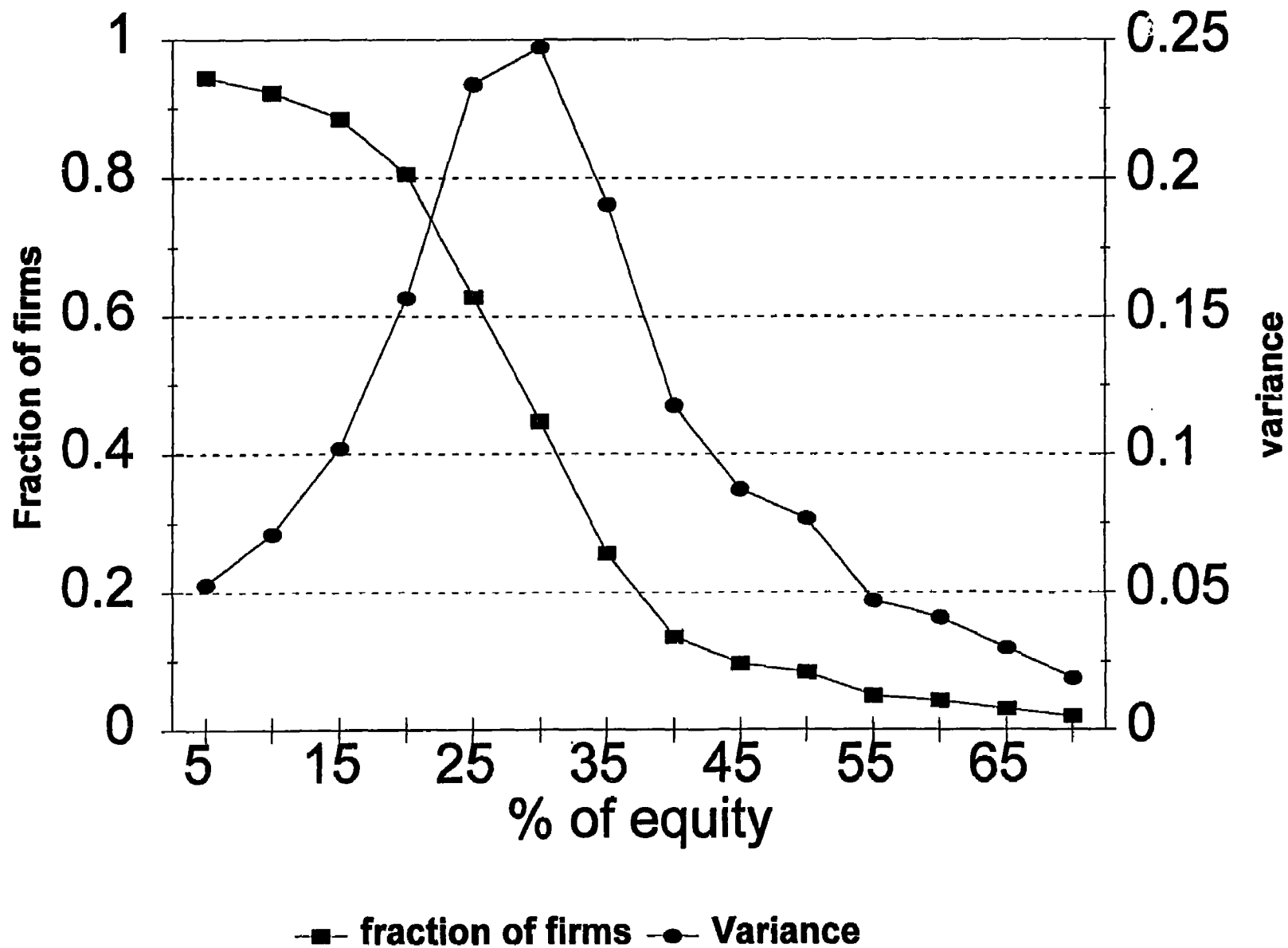


Table 2: Regression Results Using "Turnover"

Panel A			Panel B			Panel C			Panel D		
Turnover			Turnover			Turnover			Turnover		
Variable	Coef.	SE	Variable	Coef.	SE	Variable	Coef.	SE	Variable	Coef.	SE
Constant	1.23	0.10	Constant	1.45	0.12	Constant	1.18	0.09	Constant	1.35	0.11
SIZE	0.02	0.01	SIZE	0.03	0.01	SIZE	0.01	0.01	SIZE	0.02	0.01
LEV	0.05	0.02	LEV	0.06	0.02	LEV	0.04	0.02	LEV	0.05	0.02
ROA	-0.15	0.03	ROA	-0.16	0.03	ROA	-0.14	0.03	ROA	-0.15	0.03
INDUSTRY	0.01	0.01	INDUSTRY	0.02	0.01	INDUSTRY	0.01	0.01	INDUSTRY	0.01	0.01
SIZE * LEV	-0.01	0.00	SIZE * LEV	-0.01	0.00	SIZE * LEV	-0.01	0.00	SIZE * LEV	-0.01	0.00
SIZE * ROA	0.00	0.00	SIZE * ROA	0.00	0.00	SIZE * ROA	0.00	0.00	SIZE * ROA	0.00	0.00
LEV * ROA	-0.01	0.00	LEV * ROA	-0.01	0.00	LEV * ROA	-0.01	0.00	LEV * ROA	-0.01	0.00
SIZE * LEV * ROA	0.00	0.00	SIZE * LEV * ROA	0.00	0.00	SIZE * LEV * ROA	0.00	0.00	SIZE * LEV * ROA	0.00	0.00
Adjusted R <sup>2</sup>	0.12		Adjusted R <sup>2</sup>	0.13		Adjusted R <sup>2</sup>	0.11		Adjusted R <sup>2</sup>	0.12	
F-statistic	1.23		F-statistic	1.45		F-statistic	1.18		F-statistic	1.35	
Prob > F	0.00		Prob > F	0.00		Prob > F	0.00		Prob > F	0.00	

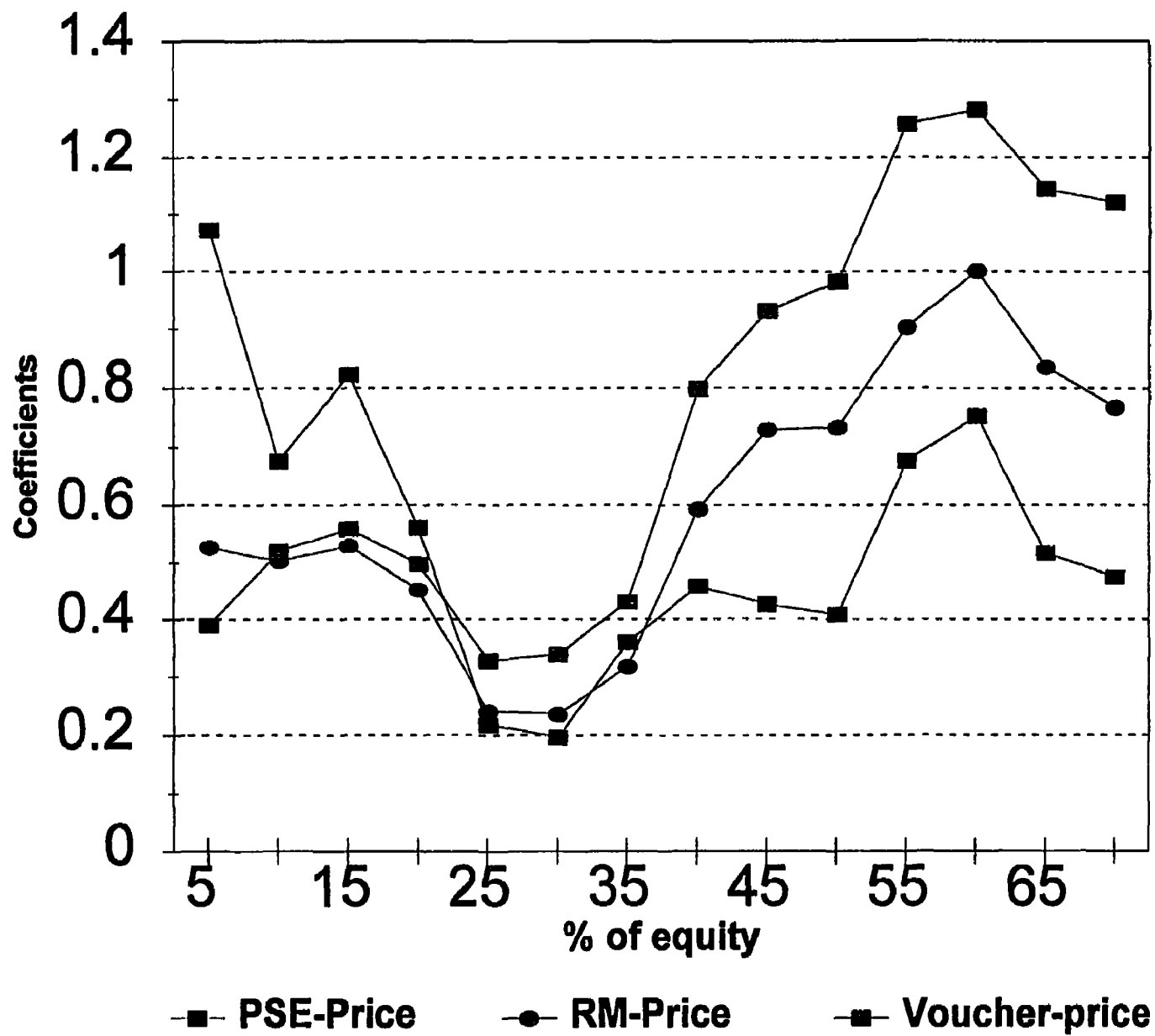
**Figure 1**

**Absolute Control by Any Shareholder**



**Figure 2**

**Coefficients for Absolute Control**  
(Three Price Series)





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